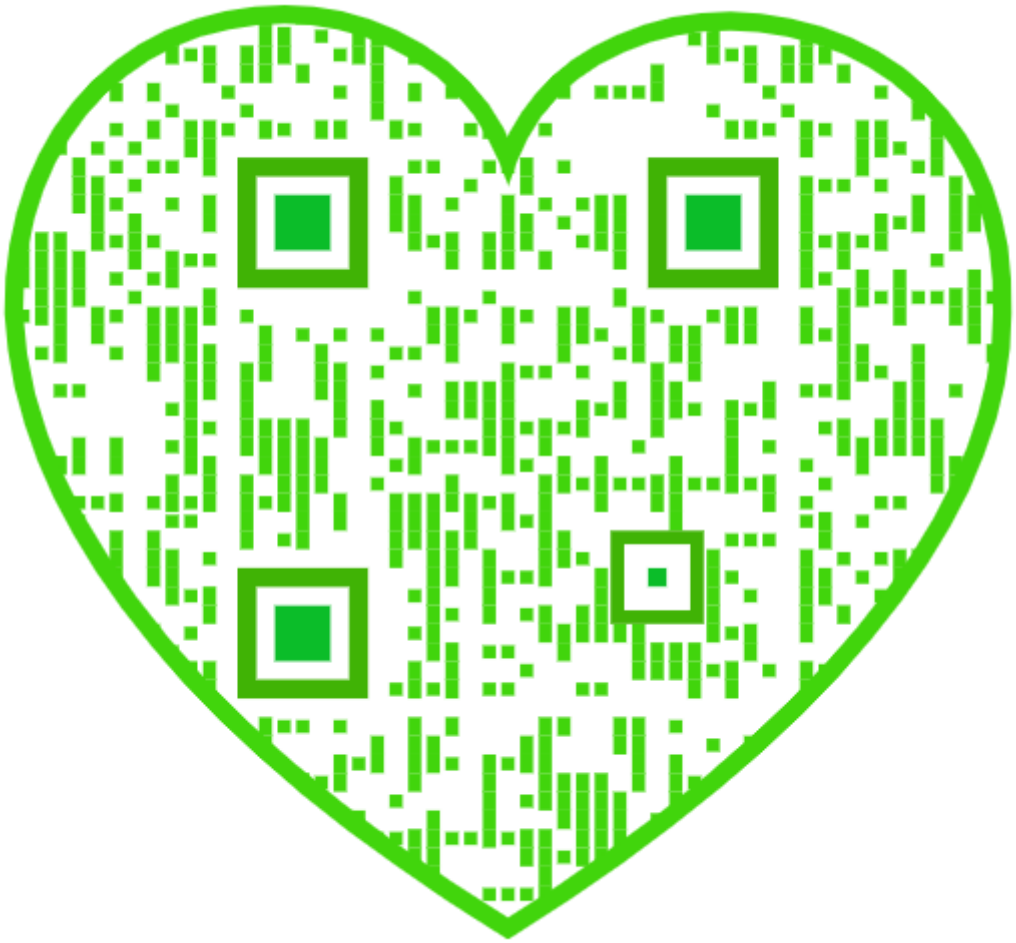
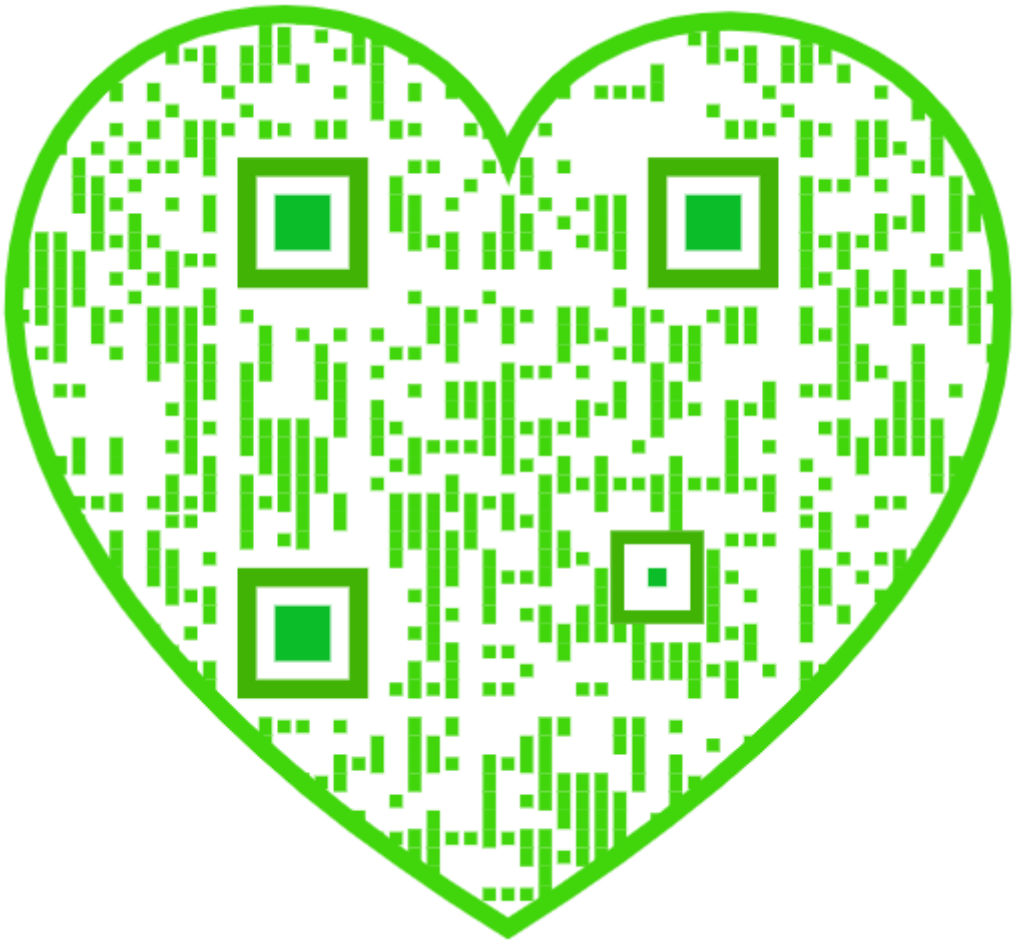




DEC 15 1906

LIBRARY
OF
EXPERIMENT STATIONS
U. S. Department of Agriculture.

Bulletin No. 10

1906

SAVING THE SWEET POTATO CROP

Tuskegee Normal and Industrial Institute

EXPERIMENT STATION

Tuskegee Institute, Alabama

By

Geo. W. Carver, M. S. Agr.

TUSKEGEE INSTITUTE, STEAM PRINT, 1906

THE TUSKEGEE EXPERIMENT STATION

Board of Regents

PRESIDENT, CHARLES COLEMAN THATCH.....Auburn, Ala
HON. R. R. POOLE.....Montgomery, Ala
MR. W. W. CAMPBELL.....Tuskegee, Ala
MR. CHARLES. W. HARE.....Tuskegee, Ala
MR. A. J. WILBORN.....Tuskegee, Ala
MR. BOOKER T. WASHINGTON.....Tuskegee Institute, Ala
MR. WARREN LOGAN.....Tuskegee Institute, Ala

Station Staff

G. W. CARVER, M. S. Agr.....Director
GEORGE R. BRIDGEFORTH.....Assistant
PERRY C. PARKS.....Farm Superintendent
GEORGE W. OWENS.....Dairy Herd
Frank H. Cardoza.....Horticulture
T. N. COWAN.....Truck Garden
H. G. MAXWELL.....Dairyman
G. W. GREENE.....Home Farm
CHARLES JOHNSON.....Stock Raising

The Tuskegee
Agricultural Experiment Station

BULLETIN NO. 10 | DECEMBER, 1906

SAVING THE SWEET POTATO CROP

G. W. CARVER, M. S. AGR., DIRECTOR

Of the many vexing problems with which the Southern farmer must deal, there are probably none more troublesome than the saving of his sweet potato crop.

Some years, all methods, from the simplest to the most complex, seem to succeed. Probably the very next year just the reverse is true, and all spoil, leaving in many instances hardly enough for seed.

The above conditions have been made the subject of investigation by our station, covering a period of five years, and we submit the results with a considerable degree of satisfaction, as we feel that certain facts have been brought to light, which, if observed, will render the successful saving of this crop much less problematical.

OBSERVATIONS

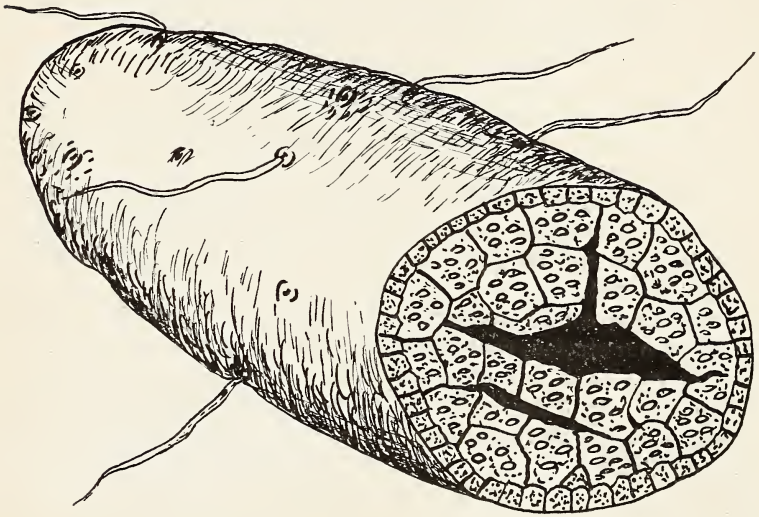
Much time was spent in riding over the country to ascertain just how the farmers kept theirs. They bank in the old-fashioned way almost universally. Some said they would not keep if planted in a certain kind of soil. Our investigations showed there was but little, if anything, to support such a statement. Others declared they would not keep unless planted, dug and banked on such and such a time of the moon. This, like the above statement, was proven false. Several other infallible methods were investigated, but suffered the same fate (disappointment) as the others to which I have referred.

It was observed, however, that the potatoes dug and banked after a long dry period, as a rule, kept well, while those dug and banked after, and during a rainy season, almost, without exception, kept poorly.

It was further observed that if potatoes were cut or broken, and the milky juice turned a dark greenish color after being ex-

posed to the air until dry, they would keep poorly; but if the juice dried white and the cut place showed a tendency to heal over, they invariably kept well.

Feeling that sufficient information had been secured to furnish material for an intelligent line of investigations, we therefore, began by examining (microscopically) a large number of potatoes, such as we have described.



Carver.

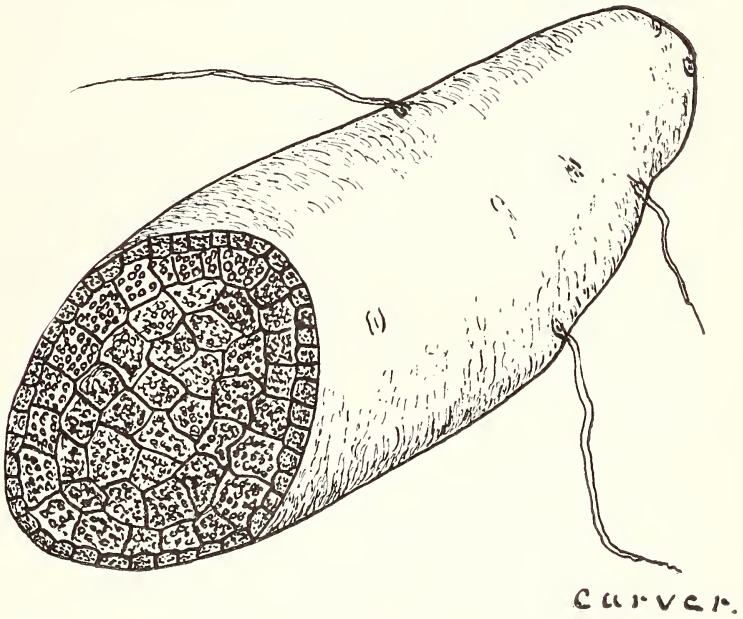
CUT 1

Cut 1 shows a portion of a potato dug from a patch planted the 25th of July and dug the 29th of October. About 400 bushels were banked the usual way in piles of 50 bushels each. Fully 90 per cent. rotted. Those remaining were pithy. Neither starch nor sugar seemed to have developed well, as the individual cells showed only a moderate granulation, and the centers of all the potatoes were more or less spongy, and often contained large cracks, as shown above. The chemical reaction for sugar and starch was very light.

Cut No. 2 shows a portion of a potato dug from a patch planted May 1st and dug October 29th. The digging, banking and

the number of bushels, etc., in the bank were exactly the same as the above. These kept almost perfectly, losing only about 5 per cent.

You will note the cells are well filled with starch. The chemical reaction for sugar, volume for volume, was more than double that of Cut 1, which shows quite conclusively that the first lot of potatoes were immature; or in other words, only partially made, leaving the cells filled largely with water, which caused the potato to more or less collapse in drying out and to become an easy prey to the various potato diseases, which are likely to attack the tubers when stored.



CUT 2

The cut also shows a well matured potato, cells well filled with starch and sugar; the water reduced to a minimum. Such are remarkably immune to the attacks of the various potato diseases, and all other things being equal, keep well with but little effort.

HARVESTING AND STORING

The importance of correctly harvesting the crop is a matter which must not be passed by lightly, as in this lies very largely the success of any method of storing. If possible, the following should be observed:

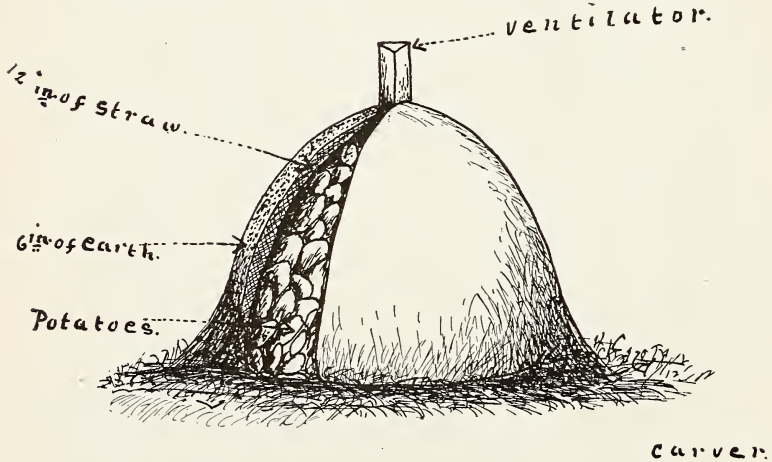
(a) Select a time when both the air and ground are dry.

(b) Remove the vines with a sharp hoe, vine cutter or any implement that will do the work rapidly and well. Cure the vines and store them away. They make excellent hay.

(c) Dig before frost injures the vines to any extent. Dig in the morning and allow the potatoes to lie out all day. Gather up in baskets or boxes holding not more than one bushel each. Handle with great care, as they are easily bruised, and every injury lessens their keeping qualities.

In the matter of storing, we think it hardly necessary to discuss more than two methods here.

1st. The old primitive method of banking, which consists in the selection of a well drained piece of land, slightly hollowing out the earth the size desired for the base of the bank. This is covered with leaves, pine tag or straw. The potatoes are piled up into a conical shaped mound around a piece of bark curled up, a board flue, or anything that will serve as a ventilator. (See cut.)



CUT 3

The cut shows also the depth to which the straw and earth should be put for this locality. The covering should vary according to the severity of the climate.

POTATO HOUSE OR CELLAR

Many experiments seem to indicate that a house or dry cellar, where heat and moisture can be in a measure controlled, is an ideal place to keep sweet potatoes.

The following varieties were used in this experiment: Red Nansemond, Cuban Queen, Dooley Yam, Pumpkin Yam and Jersey Sweets. The potatoes were dug in November (plowed out carefully) and several bushels of each variety removed to a room in the Agricultural Building used as a museum. This room had five windows on the south, a double door and transom over it on the north; the hall completing the remainder of the north side, which was lathed and plastered. The south wall and two ends were simply the brick which composed the wall whitewashed.

The temperature varied all the way from 98 degrees Fahrenheit in the summer to 30 degrees Fahrenheit in the winter. The potatoes were carefully laid out upon ordinary tables, side by side. For the most part as many of them were very large, some weighing as much as nine pounds apiece.

Once per week they were examined and the defective ones removed, the number being remarkably small. Eighty per cent. kept excellently for six months, when the small ones seemed to dry up; simply wither away. The larger ones lay upon the table and grew, throwing out a fine crop of slips, which were pulled off and planted out. The potatoes remained there during the entire summer, and the winter following until the next May (19 months in all), when another crop of sprouts were taken; the potatoes were then fed to the hogs.

Cut No. 4 shows three such potatoes. All this time they were growing less sweet and more pithy; yet, with the addition of a little sugar, they made fine custards, croquettes, fritters and creamed dishes.

Four years was devoted to this kind of experimentation, using the same room and the same methods. The success was uniform as has been described, except one year when the potatoes were dug during a very wet period and were slightly touched by frost before removing to the house. We were unable to save a single potato out of this batch. They not only all rotted, but very quickly, going within a period of three months.

The fifth year the same experiment was carried on in the basement of the same building. This room is being used now as an incubator room for hatching chickens, ducks and geese. Ten incubators are kept running during the hatching season. The room is rather dark and poorly ventilated, having only three small windows on the south side. The finishing is exactly like the room described above, and is immediately under it. One door practi-

cally on the same side with the windows constitutes the fourth and only opening in the walls. The floor is cement. During long rainy periods the water seeps through the brick and almost covers the floor, which will remain two or three weeks unless kept swept out. A stove stands in the room where fire is frequently kept.

CUT 4

The potatoes were put upon wire screens made out of fine mesh—poultry wire. Racks were made to accommodate these screens, raising the potatoes about three feet from the floor. They seem to keep here equally well.

CONCLUSIONS

From the above experiments, it seems safe to conclude that in order to successfully save sweet potatoes, we must observe the following:

1st. Set the plants out as early in the spring as late frosts will permit.

2d. Dig for housing or banking only when thoroughly ripe.

3d. Great care should be exercised in both the digging and handling to avoid cuts and bruises, as all such rot easily.

4th. That a room where the potatoes may be spread out upon tables or shelves is an advantage.

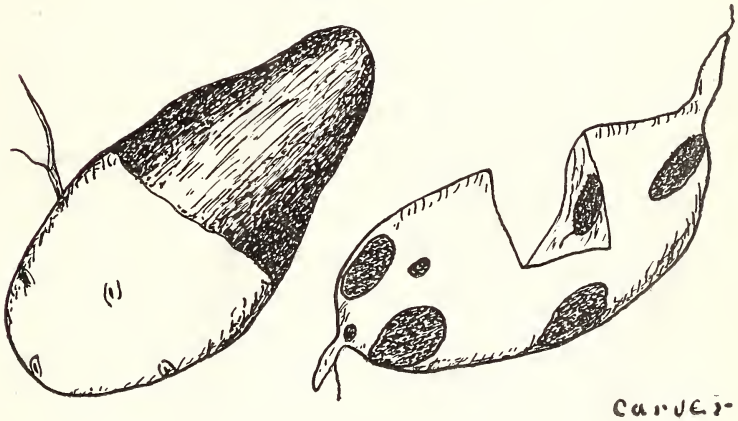
5th. That it is almost a loss of time, labor and potatoes to house or bank when immature, soaked with water or touched by frost.

6th. Creating a dry atmosphere about the stored potatoes and reducing the water in them by artificial means to its lowest point are interesting and profitable lines for investigation.

DISEASES

Bulletin No. 135 from the Experiment Station at Auburn, Ala., on "Diseases of Sweet Potatoes in Alabama," deals with them in such an interesting and thorough manner, that I shall only mention those most aggravating in this section. The above bulletin may be had free by addressing a card to the Director of the Experiment Station, requesting the same.

BLACK ROT



CUT 5

Black rot (Ceratocytis fimbriata).

This disease is very troublesome and destructive in the store room. With us all varieties seemed to be equally affected. The tubers are more or less marked, according to the severity of the disease, with dark brown patches, which give the whole tuber an unpleasant bitter taste. If only slightly affected, they bear rather a strong resemblance in taste to frosted potatoes, and for this reason many mistakes are made. This disease was especially troublesome in one of our beds, containing seed purchased from outside parties. About 99 per cent. of the slips and potatoes

rotted. The slips turn black at the bottom and soon die. It is commonly known in this section as "Black Shank," "Stem Rot," "Fire Blight," etc.

REMEDIES

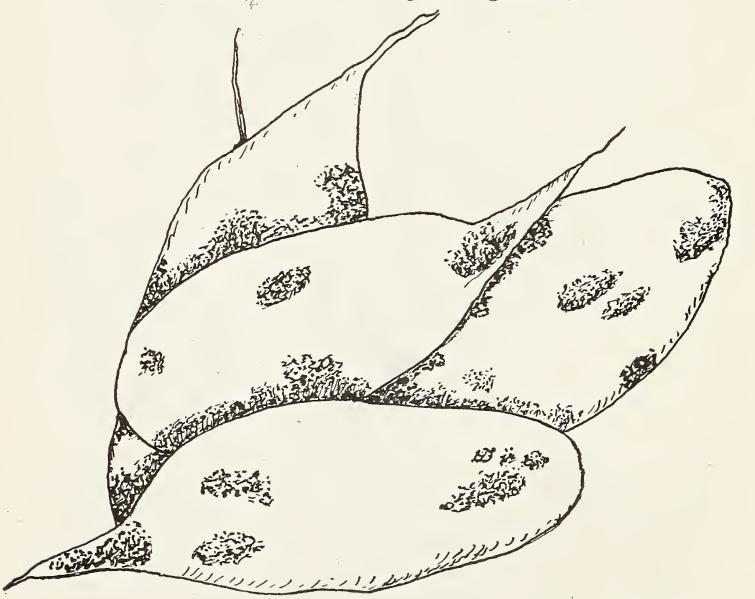
(a) Avoid planting slips from a diseased bed.

(b) Do not save seed from a field containing diseased tubers.

(c) Rotate the crop. Do not plant two years in the same place.

Several other remedies were tried with questionable success, but the above gave beneficial results without question.

SOFT ROT (Rhizopus Nigricans)



CUT 6

In this section this disease seems to be by far the most destructive of all diseases, and so far as observation goes, is a storage trouble, being confined strictly to the tubers. It attacks the potato wherever there are bruised or cut places, broken skin, etc., appearing in black powdery masses like the black mould of bread. Immature, cut, broken and bruised potatoes are harbingers and breeders of the disease.

REMEDIES

(a) Nothing but mature potatoes should be banked or housed.

(b) Dry them out thoroughly before storing.

(c) Avoid, as far as possible, the putting in of tubers cut, bruised or injured in anyway.

(d) Keep cool and as dry as possible; also, free from rats, mice or destructive vermin of any kind.

MISCELLANEOUS NOTES

Since the publication of Bulletin 2 on "Sweet Potatoes," three methods of cultivation have been given considerable attention.

(a) The hill method, which consists in making large hills, almost a foot high and setting the potatoes in the center of this hill.

(b) Throwing up a ridge about the same height as the hill mentioned above.

(c) The new method, or which may be termed flat cultivation.

Since the last method gave the best results in every case, I will describe it in detail.

The land, which is a light gray, sandy loam, containing about 25 per cent. of sand, was turned to a depth of 9 inches with a two-horse plow; then harrowed thoroughly with a spring tooth harrow, going over it several times. At this point 7 tons per acre of well rotted barnyard manure was applied broadcast. It was again plowed with the two-horse plow crosswise. Two hundred pounds of muriate of potash, 120 pounds of acid phosphate per acre were sown broadcast and harrowed in with a disc, harrow going over the ground several times. A slight ridge of about 4 inches was thrown up and the plants set upon it. Without an exception, the plants outgrew those planted in ridges and hills, as the vines soon covered the ground and reduced the evaporation of moisture to the minimum, which is of utmost importance in connection with such soils as I have described. The yield of marketable potatoes was from one-third to one-half more in favor of flat cultivation.

In this section all the leading varieties of sweet potatoes can be raised with ease. Every farmer should put out a patch large enough to not only feed his family and have a few bushels to sell, but enough to feed his stock. They make excellent food for all kinds of stock, and should be to the South what the sugar beet is to the West in the matter of feeding stock.

We have tried a few experiments with these special varieties adapted to canning, such as the Pumpkin Yam, Jersey Sweet, Bunch Yam, Sugar and Dooley Yam. They all seem to be quite at home in our soils and give satisfactory yields. Indeed they can be grown with such ease and of such superior quality, that it seems to me that well appointed canneries in several sections of the South could not help but be paying investments.

As a nutritious forage for stock, the vines must not be overlooked. Chemists have made a number of analysis which differ somewhat; yet, in the main, the vines seem to possess about the same feeding value as young succulent pea vines. All kinds of stock eat them greedily when green. They dry with about the same ease as pea vines, and are possibly a little more troublesome to handle, owing to their length. Throwing them across the fence, poles or racks is a very good way; although, some spread them out on the ground and allow them to cure in this way. They invariably dry very dark, but it does not seem to lessen their palatability in the least. Several attempts have been made to make silage of them, but as far as the writer knows, the efforts have not been very successful. The vines becoming slimy and quite soft after being kept several weeks. Stock do not seem to relish them as much as when dried as above described.